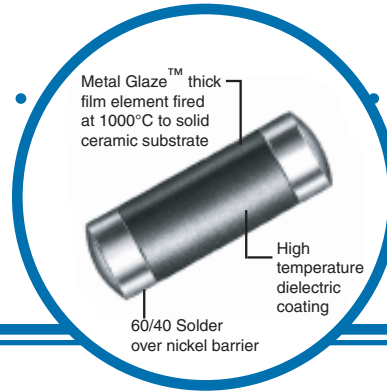


Metal Glaze™ General Purpose Surface Mount Power Resistor



MM Series

- Up to 2 watts
- Up to 1000 volts
- 0.1 ohm to 2.2 megohm range
- 150°C maximum operating temperature



Electrical Data

| Size Code | Industry Footprint | IRC Type | Maximum Power Rating | Working Voltage ² | Resistance Range (ohms) | Tolerance (+%) ³ | TCR (ppm/°C) ³ | Product Category |
|-----------|--------------------|----------|----------------------|------------------------------|-------------------------|-----------------------------|---------------------------|------------------|
| B | 1206 | MMA0204 | 1/2 | 400 | 0.1 to 0.99 | 1, 2, 5 | 100 | Low Range |
| | | | | | 1.0 to 1.0M | 1, 2, 5 | 50, 100 | Standard |
| | | | | | 20 to 348K | 0.25, 0.5 | 50, 100 | Tight Tolerance |
| F | 2512 | MMB0207 | 1 | 700 | 0.1 to 0.99 | 1, 2, 5 | 100 | Low Range |
| | | | | | 1.0 to 2.21M | 1, 2, 5 | 50, 100 | Standard |
| | | | | | 20 to 348K | 0.25, 0.5 | 50, 100 | Tight Tolerance |
| H | 3610 | MMC0310 | 2 | 1000 | 0.1 to 0.99 | 1, 2, 5 | 100 | Low Range |
| | | | | | 1.0 to 2.21M | 1, 2, 5 | 50, 100 | Standard |

¹Not to exceed $\sqrt{P \times R}$ ²Consult factory for tighter TCR, tolerance, or resistance values.

Environmental Data

| Characteristics | Maximum Change | Test Method |
|--------------------------------|--------------------------------------|--|
| Temperature Coefficient | As specified | MIL-R-55342E Par 4.7.9 (-55°C +125°C) |
| Thermal Shock | ±0.5% +0.01Ω | MIL-R-55342E Par 4.7.3 (-65°C +150°C, 5 cycles) |
| Low Temperature Operation | ±0.25% +0.01Ω | MIL-R-55342E Par 4.7.4 (-65°C @ working voltage) |
| Short Time Overload | ±0.5% +0.01Ω ±1% for R>100KΩ | MIL-R-55342E Par 4.7.5 2.5 x $\sqrt{P \times R}$ for 5 seconds |
| High Temperature Exposure | ±0.5% +0.01Ω | MIL-R-55342E Par 4.7.6 (+150°C for 100 hours) |
| Resistance to Bonding Exposure | ±0.25% +0.01Ω | MIL-R-55342E Par 4.7.7 (Reflow soldered to board at 260°C for 10 seconds) |
| Solderability | 95% minimum coverage | MIL-STD-202, Method 208 (245°C for 5 seconds) |
| Moisture Resistance | ±0.5% +0.01Ω | MIL-R-55342E Par 4.7.8 (10 cycles, total 240 hours) |
| Life Test | ±0.5% +0.01Ω | MIL-R-55342E Par 4.7.10 (2000 hours @ 70°C intermittent) |
| Terminal Adhesion Strength | ±1% +0.01Ω no mechanical damage | 1200 gram push from underside of mounted chip for 60 seconds |
| Resistance to Board Bending | ±0.5% +0.01Ω no mechanical damage | Chip mounted in center of 90mm long board, deflected 5mm so as to exert pull on chip contacts for 10 seconds |

General Note

IRC reserves the right to make changes in product specification without notice or liability. All information is subject to IRC's own data and is considered accurate at time of going to print.

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Metal Glaze™ General Purpose Surface Mount Power Resistor



Physical Data

| Size Code | Industry Footprint | Actual Size | Dimensions (Inches and (mm)) | | |
|-----------|--------------------|-------------|--------------------------------|--------------------------------|--------------------------------|
| | | | L | W | C* |
| | | | B | 1206 | |
| F | 2512 | | 0.251 ± 0.010 (6.38 ± 0.25) | 0.079 ± 0.006 (2.01 ± 0.15) | 0.040 ± 0.010 (1.02 ± 0.25) |
| H | 3610 | | 0.367 ± 0.010 (9.32 ± 0.25) | 0.105 ± 0.006 (2.67 ± 0.15) | 0.050 ± 0.010 (1.27 ± 0.25) |

*C dimension is average termination width.

Recommended Solder Pad Dimensions (Reflow):

| Size Code | Industry Footprint | Dimensions (Inches and mm) | | | | | |
|-----------|--------------------|----------------------------|-----------------|-----------------|-----------------|-----------------|------------------|
| | | A | B | C | D | E | F |
| B | 1206 | 0.076 (1.93) | 0.093 (2.36) | 0.058 (1.47) | 0.098 (2.49) | 0.032 (0.81) | 0.211 (5.36) |
| F | 2512 | 0.121 (3.07) | 0.126 (3.20) | 0.127 (3.23) | 0.183 (4.65) | 0.040 (1.02) | 0.369 (9.37) |
| H | 3610 | 0.170 (4.32) | 0.160 (4.06) | 0.213 (5.41) | 0.273 (6.93) | 0.044 (1.12) | 0.553 (14.05) |

Metal Glaze™ General Purpose Surface Mount Power Resistor

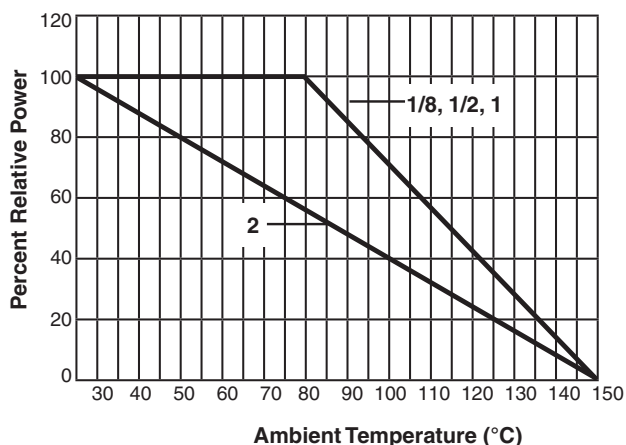


Standard Reel Packaging per EIA-481:

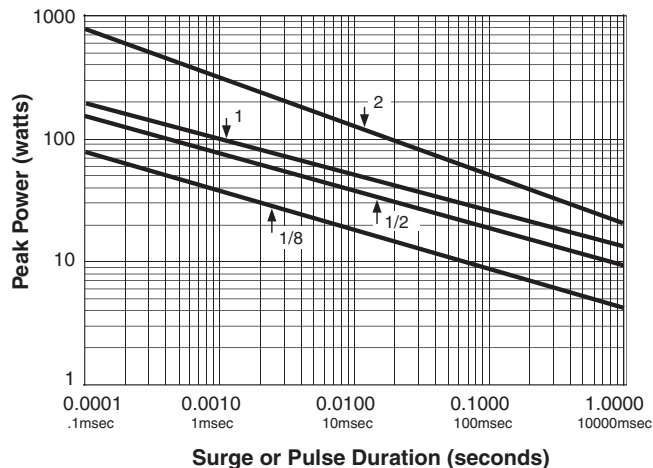
| Size Code | Industry Footprint | Reel Diameter* | Quantity Per Reel | Carrier Tape Width | Component Pitch |
|-----------|--------------------|----------------|-------------------|--------------------|-----------------|
| B | 1206 | 7" | 2,500 max. | 8mm | 4mm |
| | | 13" | 10,000 max. | | |
| F | 2512 | 7" | 1,500 max. | 12mm | 4mm |
| | | 13" | 5,000 max. | | |
| H | 3610 | 13" | 1,500 max. | 24mm | 4mm |

*The 13" reel is considered standard and will be supplied unless otherwise specified.

Power Derating Curve



Repetitive Surge Curve



Note: Use for repetitive pulses where the average power dissipation is not to exceed the component rating at 70°C. Surge handling capacity for low-repetitive surges may be significantly greater than shown above. Contact factory for recommendations.

Ordering Data

| | | | | | |
|-------------------------------|--|----|------|---|----|
| Sample Part No. | MMA0204 | 50 | 2203 | F | 13 |
| IRC Type | (MMA0204, MMB0207, MMC0310) | | | | |
| Temperature Coefficient | 50 = ±50 ppm/°C; 100 = ±100 ppm/°C | | | | |
| Resistance Value | (100 ohms and greater - First 3 significant figures plus 4th digit multiplier) Example: 100 ohms = 1000, 1000 ohms = 1001, 150,000 ohms = 1503 (Less than 100 ohms - 'R' is used to designate decimal) Example: 51 ohms = 51R0, 1 ohm = 1R00, 0.25 ohm = R250 | | | | |
| Tolerance | (D = 0.5%, F = 1.0%) | | | | |
| Packaging Details | (BLK = Bulk, 7 = 7" Reel, 13 = 13" Reel) | | | | |

Note:

RoHS compliance is noted by inserting "LF" into the part number immediately following the tolerance designator. RoHS compliant metallization is 96.5% Sn / 3% Ag / 0.5% Cu. RoHS-compliant product is NOT backwards compatible to Sn/Pb soldering environments.